MIL-C-17711B (OS)
14 May 1974
SUPERSEDING
MIL-C-17711A (OS)
2 August 1966

MILITARY SPECIFICATION

COATINGS, CHROMATE, FOR ZINC ALLOY CASTINGS AND HOT-DIP GALVANIZED SURFACES

This specification is approved for use by all departments and agencies of the Department of Defense.

1. SCOPE

1.1 This specification covers chromate coatings for use with zinc base alloy cast surfaces and hot-dip galvanized surfaces. (See 6.1.)

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issues in effect on date of invitation for bids or request for proposal form a part of this specification to the extent specified herein.

STANDARDS

Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes

*(Copies of specifications, standards, drawings and publications required by contractors in connection with specific procurement functions shall be obtained from the procuring activity or as directed by the contracting officer.)

FSC MFFP

*2 2 **Other publications** The following documents form a part of this specification to the extent specified herein Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply

American Society for Testing and Materials

ASTM B 117	Standard Method of Salt Spray (Fog) Testing

*(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103.)

3 REQUIREMENTS

3 1 **Materials.** The materials used shall be such as to produce coatings on zinc base alloy cast surfaces and hot-dip galvanized surfaces which meet the requirements of this specification

3 2 **General requirements.**

3 2 1 **Application.** Unless otherwise specified, the chromate coating shall be applied after all forming, machining, perforating, brazing, and welding of the article or item has been completed

3 2 2 **Treatment.** The chromate coating should consist of insoluble trivalent chromium compounds and somewhat soluble hexavalent chromium compounds. Unless otherwise specified, the treatment for conversion of the chromate coating shall be either a chemical or electrochemical treatment in an aqueous solution of salts, acids, or both, and containing hexavalent chromium and activating acid radical(s). The articles or items so treated shall be thoroughly rinsed and dried according to the requirements of the particular chemical or electrochemical process used

3 2 3 **Appearance and color.** The chromate coating shall be a continuous, smooth, distinct protective film, colored golden brown to dark brown without pronounced iridescence A slightly iridescent coating, short of a golden brown is preferred A greenish tone in the coating, due to copper containing alloys, will be acceptable When applied by an electrochemical process, yellow coatings will be acceptable

*3.2.4 **Inserts.** Parts such as inserts of non-zinc material which would be attacked by cleaning or chromate coating solutions or would prevent the formation of chromate coatings on the zinc surface or cause attack of the zinc alloy or basis metal shall not be coated as an assembly unless the non-zinc surface can be masked or insulated in a manner acceptable to the procuring agency.

*3.2.5 **Handling.** Parts shall be so handled during all pretreatment and post treatments that mechanical damage or contamination from uncovered hands or soiled gloves may be avoided. Soiled parts shall be cleaned in a suitable solvent.

3.3 **Salt spray requirements.** Chromate coated zinc surfaces shall show no white corrosion products of zinc as defined in 3.3.1 at the end of 96 hours when tested by continuous exposure to the 5 percent salt spray test in accordance with 4.5.

3.3.1 For chromate coatings, the appearance of white corrosion products visible to the unaided eye at normal reading distance, at accidental scratches through the chromate film to the zinc surface, or at unscratched areas of the chromate film shall be cause for rejection. White corrosion products at edges of specimens shall not constitute failure.

3.4 **Workmanship.** The chromate coatings covered by this specification shall be produced by suitable treatments controlled and operated to give a uniform product as specified herein.

*3.5 **Basis metal.** The basis metal shall be free from surface defects caused by machining, cutting, buffing, etc., that will be detrimental to the functional use of the coating. The basis metal shall be subjected to cleaning methods as are necessary to yield coatings meeting all requirements of this specification.

*3.6 **Equipment and processes.** The equipment and processes employed shall be such as to produce coatings which meet the requirements of this specification. Unless otherwise specified in the contract, order, or applicable drawings (see 6.2), process operating conditions shall be at the option of the supplier, subject to approval of the procuring activity.

4 QUALITY ASSURANCE PROVISIONS AND TEST REQUIREMENTS

*4 1 **Responsibility for inspection.** Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements

4 2 **Lot.** A lot shall consist of coated articles of the same basis metal from the same chromate coating run or bath, and approximately the same size and shape which are submitted for acceptance at one time

4 3 **Sampling.**

4 3 1 **For visual examination.** A sample of coated articles shall be taken at random in accordance with MIL-STD-105, Inspection Level II, with an acceptable quality level (AQL) of 1 5 percent defective

4 3.2 **For salt spray requirements.** A random sample of three coated articles shall be taken from each lot or three separately plated specimens shall be prepared in accordance with 4 3 2 1 to represent each lot

4 3 2 1 **Separate specimens.** When the coated articles are of such form as not to be readily adaptable to the salt spray test or are for tests of small lot sizes, the test shall be made by use of separate specimens coated concurrently with the articles represented The separate specimens shall be of a basis metal equivalent to that of the articles represented Equivalent basis metal includes chemical composition, heat treatment, and finish of surface prior to coating For example, in applications where coated parts are too large for the salt spray equipment, sections of castings or physical test specimens for castings which have been coated with the lot may be used. For large galvanized fabricated articles, strips of material cut from the article or pieces of the basis metal, approximately 2 inches wide by 6 inches long, galvanized concurrently with the lot, may be used for the test Such specimens shall be introduced into the lot at regular intervals prior to the cleaning operations preliminary to galvanizing and shall not be separated therefrom until after completion of the processing Conditions affecting the chromating of the specimens including the spacing and positions with respect to anodes and to other objects being coated should correspond as nearly as possible to those affecting the significant surfaces of the articles represented

4.4 **Visual examination.** Samples selected in accordance with 4.3.1 shall be examined for compliance with the requirements of 3.2.3 after chromating. The lot represented by the samples shall not be rejected if there is no uniformity of color.

*4.5 **Salt spray test.** Unless otherwise specified in the contract or purchase order, compliance with the requirements of 3.3 shall be determined for the coated articles. Test specimens, selected in accordance with 4.3.2, shall be tested in accordance with ASTM B 117. To secure uniformity of results, chromate coated specimens shall be aged at room temperature for at least 24 hours before subjection to the salt spray test. Failure of one or more of the specimens shall constitute failure of the lot.

4.5.1 **Extension of salt spray test.** For extended production runs, salt spray tests may be made periodically at the discretion of the procuring activity or when there is reason to believe that the chromate coating solutions might not be operating properly.

4.6 **Retests.** Articles rejected or withdrawn because of defective or deficient coating may be resubmitted after stripping and recoating or screening of the entire lot. Care shall be exercised in stripping of coatings to avoid removal of zinc in amounts which might affect the serviceability of the coated parts. Full particulars concerning the recoating shall be furnished to the procuring activity.

5. PREPARATION FOR DELIVERY

5.1 There are no packaging, packing, or marking requirements applicable to this specification.

6. NOTES

6.1 **Intended use.** The prime purpose of chromate coatings is to retard or prevent the formation of white corrosion products on surfaces exposed to stagnant water, high humidity atmospheres, salt water, marine atmospheres, as exposed to cyclic condensation and drying. Some types of chromate coatings have proved satisfactory as a base for paint

6.2 **Ordering data.** Procurement documents should specify the following

(a) Title, number, and date of this specification.

(b) Special application and treatment procedures, if applicable (See 3 2.1 and 3 2.2)

(c) Salt spray test, if not required (See 4 5.)

6 3 **Chromate coatings for plated surfaces.** The requirements for chromate coatings for electrodeposited zinc plated surfaces are covered by QQ-Z-325. The requirements for chromate coatings for cadmium plated surfaces by electrodeposition are covered by QQ-P-416, whereas those cadmium plated surfaces by vacuum deposition are covered by MIL-C-8837.

6.4 Chromate coatings may be used on zinc hot-dip galvanized surfaces to prevent finger marking damage which may occur during assembly and storage

6.5 Treatments for the chromate coatings which involve only dipping in chemical solutions normally require a sufficient period of drying to render the parts suitable for handling without damage to the coating while in gelatinous form, and it is important with such, that the coating is not excessively damaged while wet Chromating processes of the electrochemical type normally produce conversion films that do not require drying to avoid film fracture in production

*6 6 The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodian
Navy -OS

Preparing Activity
Navy-OS
(Project No MFFP-N082)

INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide gestions. This form may be detached, folded along the lines indicated, taped along the loose edge *(DO NOT STAPLE)*, and led. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document*(s)* or to amend contractual requirements.

(Fold along this line)

(Fold along this line)

DEPARTMENT OF THE NAVY

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 12503 WASHINGTON D C

POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE NAVY

Commanding Officer
Naval Ordance Station
Standardization/Documentation Division (Code 524
Indian Head, MD 20640

(TO DETACH THIS FORM, CUT ALONG THIS LINE)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1 DOCUMENT NUMBER	2 DOCUMENT TITLE

3a. NAME OF SUBMITTING ORGANIZATION	4 TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)* _____

5. PROBLEM AREAS

a. Paragraph Number and Wording

b. Recommended Wording

c. Reason/Rationale for Recommendation

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b WORK TELEPHONE NUMBER *(Include Code)* – Optional
c MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8 DATE OF SUBMISSION *(YYMMDD)*

DD FORM 82 MAR 1426 PREVIOUS EDITION IS OBSOLETE